

**Abstract**

An electromagnetic, liquid or gas cooled solenoid coil is constructed of an inner  
5 core formed by a simulated pole piece. The inner core has coolant feed ports that  
communicate with a surrounding perforated bobbin. A pair of ordinary electromagnetic  
wires is twisted around each other to form a helix, and the helix is wrapped around the  
perforated bobbin. Liquid or gas coolant is introduced into an opening in the core, flows  
through the ports into the bobbin, and then flows radially through the coil from the inside  
10 diameter of the coil to the outside diameter of the coil, thereby removing heat from the  
self-heating coil wire. In alternative embodiments, a supply manifold and receiver  
manifold are integrated into the solenoid coil.